

OCR Computer Science A Level

1.1.2 Types of Processor

Advanced Notes



Specification:

1.1.2 a)

- RISC Processors
- CISC Processors
- The difference between RISC and CISC

1.1.2 b)

- GPUs and their uses

1.1.2 c)

- Multicore Systems
- Parallel Systems



RISC and CISC processors

Reduced Instruction Set Computers (RISC)

In these processors, there is a **small instruction set**. Each instruction is approximately **one line of machine code** and takes one clock cycle. Below is an example of multiplying two numbers X and Y.

LDA	R1,	X
LDA	R2,	Y
MULT	R1,	R2
STO	R1,	X

Complex Instruction Set Computers (CISC)

In these processors there is a **large instruction set**. The aim is to try and accomplish tasks in as few lines of assembly code as possible. These instructions are built into the **hardware**. Early on these processors were used as the standard, however with time they got replaced by RISC design. Now they are used more in **microcontrollers** and **embedded systems**. For comparison, below is the same code as above but written for a CISC processor.

MULT A, B

Comparison between RISC and CISC

RISC Processors	CISC Processors
The compiler has to do more work to translate high level code into machine code.	The compiler has less work to translate high level code into machine code.
More RAM is required to store the code.	Less RAM is required since code is shorter.
Pipelining is possible since each instruction takes one clock cycle.	Many specialised instructions are made, even though only a few of them are used.



Multi-core and Parallel Systems

Multi-core CPUs have **multiple independent cores** that can complete instructions separately which results in higher performance. Parallel systems accomplish a similar task however instead of requiring multiple cores they can complete tasks with a single core, by

using **threading**. Generally, multi-core systems perform better in larger projects than parallel systems.

A-Level only

Graphics Processing Unit (GPU)

A graphics processing unit (GPU) is a device which unlike CPUs has **lots of independent processors** which work in parallel making it very efficient at completing **repetitive tasks** such as image processing and machine learning. GPUs are a type of **co-processor** (a secondary processor designed to supplement the activities of the primary processor).

